UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/666,206	09/17/2003	Ashim Biswas	ITL.1702US (P17106)	8300

21906 7590 10/17/2007

TROP PRUNER & HU, PC
1616 S. VOSS ROAD, SUITE 750
HOUSTON, TX 77057-2631

EXAMINER	
EJAZ, NAHEED	

ART UNIT	PAPER NUMBER
2611	

MAIL DATE	DELIVERY MODE
10/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/666,206	BISWAS ET AL.	
	Examiner	Art Unit	
	Naheed Ejaz	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 September 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-21 have been considered but are moot in view of the new ground(s) of rejection.

Response to Amendment

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1- 9 are rejected under 35 U.S.C. 112, first paragraph because of the following:

4. With respect to claims 1, 12, 13, 17,18 & 21, although the limitations "coset selector" (line 7) and "determine a number of nearest cosets" (claim 1, line 8), "determining at least four nearest cosets" (claim 12, line 2), "generating a sequence of points based on the at least four nearest cosets" (claim 12, line 3), "determining a number of nearest cosets" (claim 17, line 2), "generating a sequence of points based on the number of nearest cosets" (claim 18, lines 2-3), "coset selector" (claim 20, line 2), "determine a number of nearest cosets" (claim 20, line 3) have the written support but Specification never explains what coset is and how it's been determined. Clarification is required.

5. Claims 2-9 & 19 are also rejected under 35 U.S.C. 112, first paragraph because they depend on rejected claims 1 & 18 respectively.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rasky et al. (5,278,871) in view of Ware et al. (6,553,518) (hereinafter, Rasky and Ware respectively).

8. As per claim 10, Rasky teaches, 'determining two constellation points that are nearest a received symbol (figure 2, elements 200-203, 206 & 208, col.2, lines 54-58); combining the received symbol and at least one of the two constellation points to produce at least one difference value (figure 2, elements 201, 203, Δ_1 & Δ_2, col.5, lines 15-31, col.9, lines 13-22)(it should be noted that Rasky is calculating the nearest two constellation points with respect to the received signal r(k) (figure 2, elements 201, 202 & 208) and determines the difference value in order to calculate the error between the received signal and the closest constellation point (col.5, lines 20-22) which reads on claim limitations 'determining two constellation points that are nearest a received symbol' and 'combining the received symbol and at least one of the two constellation points to produce at least one difference value').

Rasky does not teach constellation index.

Ware teaches, 'identifying a constellation index corresponding to the received symbol based on the two constellation points and the at least one difference value' (figure 8, col.11, lines 65-67, col.12, lines 1-38).

It would have been obvious to one of ordinary skill in the art, at the time invention was made, to implement the teachings of Ware into Rasky in order to detect severe errors with greater precision by using multiple constellation threshold as taught by Ware (see Abstract).

9. Claims 11, 15, 16 & 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rasky et al. (5,278,871) in view of Ware et al. (6,553,518), as applied to claim 10 above, and further in view of Yeh (6,112,266).

10. As per claim 11, Rasky teaches all the limitations in the claim but fails to disclose two constellation indices.

Ware teaches, 'determining two constellation indices that correspond to the two constellation points' (figure 8, col.11, lines 54-67, col.12, lines 1-20). Moreover, Ware teaches two constellation indices based on the at least one difference value to identify the constellation index corresponding to the received symbol (figure 8, col.11, lines 65-67, col.12, lines 1-33).

It would have been obvious to one of ordinary skill in the art, at the time invention was made, to implement the teachings of Ware into Rasky in order to detect severe errors with greater precision by using multiple constellation threshold as taught by Ware (see Abstract).

Rasky and Ware do not teach interpolating between the two constellation indices.

Yeh discloses constellation mapper (figure 2, element 242) that provides co-ordinates that include index 'j' in order to interpolate by shaping filter 244 (figure 2, col.5, lines 34-44) which reads on claim limitations of 'interpolate between the two constellation indices'.

It would have been obvious to one of the ordinary skill in the art, at the time invention was made, to implement the teachings of Yeh into Rasky and Ware in order to create co-ordinate streams (claimed constellation points) which have narrow bandwidths as taught by Yeh (col.5, lines 36-47) in order to reduce the computational complexity with respect to constellation and thus increase system performance.

11. As per claim 15, Rasky teaches, 'instructions for determining two constellation points that are nearest a received symbol' (figure 2, elements 201 & 203, 208). Moreover, it is shown in figure 2 of Rasky that constellation point 201 is greater than the received symbol (figure 2, elements 201 & 206) and constellation point 203 is less than the received symbol (figure 2, elements 203 & 208) which reads on claim limitations 'one constellation point of the two being greater than or equal to the received symbol and another constellation point of the two being less than or equal to the received symbol'. Furthermore, it should be noted that Rasky discloses steps of decoding the received signal/vector by calculating an error signal which is difference between received signal and the nearest constellation point (col.9, lines 1-22) and in order to execute the steps the decoder (figure 1, element 108) generates/manipulate received signal (claimed instructions for determination, identification and interpolation between constellation points).

Rasky does not teach indices and interpolating of constellation points.

Ware teaches, 'identifying two constellation indices that correspond to the two constellation points' and 'produce a constellation index corresponding to the received symbol' (figure 8, col. 11, lines 54-67, col.12, lines 1-16).

It would have been obvious to one of ordinary skill in the art, at the time invention was made, to implement the teachings of Ware into Rasky in order to detect severe errors with greater precision by using multiple constellation threshold as taught by Ware (see Abstract).

Rasky and Ware do not teach interpolating of constellation points.

Yeh discloses constellation mapper (figure 2, element 242) that provides co-ordinates that include index 'j' in order to interpolate by shaping filter 244 (figure 2, col.5, lines 34-44) which reads on claim limitations of 'interpolating between the two constellation indices'.

It would have been obvious to one of the ordinary skill in the art, at the time invention was made, to implement the teachings of Yeh into Rasky and Ware in order to create co-ordinate streams (claimed constellation points) which have narrow bandwidths as taught by Yeh (col.5, lines 36-47) in order to reduce the computational complexity with respect to constellation and thus increase system performance.

12. As per claim 16, Rasky teaches instructions for performing steps (claimed instructions for combining and interpolating) (see claim 15 rejection above). Rasky teaches, 'combining the received symbol and the two constellation points to produce

difference value' (figure 2, elements 201, 203, Δ_1 & Δ_2, col.5, lines 15-31, col.9, lines 13-22).

Rasky does not produce difference values to produce the constellation index.

Ware teaches, 'use the difference values to produce the constellation index' (figure 8, col.11, lines 54-67, col.12, lines 1-16).

It would have been obvious to one of ordinary skill in the art, at the time invention was made, to implement the teachings of Ware into Rasky in order to detect severe errors with greater precision by using multiple constellation threshold as taught by Ware (see Abstract).

Rasky and Ware do not teach interpolation.

Yeh discloses constellation mapper (figure 2, element 242) that provides co-ordinates that include index 'j' in order to interpolate by shaping filter 244 (figure 2, col.5, lines 34-44) which reads on claim limitations of 'interpolate between the two constellation indices'.

It would have been obvious to one of the ordinary skill in the art, at the time invention was made, to implement the teachings of Yeh into Rasky and Ware in order to create co-ordinate streams (claimed constellation points) which have narrow bandwidths as taught by Yeh (col.5, lines 36-47) in order to reduce the computational complexity with respect to constellation and thus increase system performance.

13. As per claim 20, Rasky teaches, 'receive a symbol and to determine two constellation points that are proximate to the received symbol' (figure 2, elements 201, 203, 206 & 208). Rasky does not teach constellation index.

Ware teaches, 'determine a constellation index corresponding to the received symbol based on the received symbol and the two constellation points' (figure 8, col.11, lines 54-67, col.12, lines 1-33). It should be noted that symbol constellation identified by the index variable i (claimed index mapping) are used by detector 88 (figure 8, col.12, lines 6-20) and is considered to be equivalent to claim limitations of 'index mapper'.

It would have been obvious to one of ordinary skill in the art, at the time invention was made, to implement the teachings of Ware into Rasky in order to detect severe errors with greater precision by using multiple constellation threshold as taught by Ware (see Abstract).

Rasky and Ware do not teach constellation mapper.

Yeh teaches, 'constellation mapper' (figure 2, element 242). It is noted that constellation mapper 242 (figure 2) of Yeh is included in the device driver 147 of the modem 200 (figure 2, col.4, lines 64-67) and therefore, it can be implemented by a hard disk (claimed 'a hard disk proximate the constellation mapper').

It would have been obvious to one of the ordinary skill in the art, at the time invention was made, to implement the teachings of Yeh into Rasky and Ware in order to create co-ordinate streams (claimed constellation points) which have narrow bandwidths as taught by Yeh (col.5, lines 36-47) in order to reduce the computational complexity with respect to constellation and thus increase system performance.

14. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rasky et al. (5,278,871) in view of Ware et al. (6,553,518), as applied to claim 10 above, and further in view of Forney (WO 98/32257).

15. As per claim 12, Rasky and Ware teach all the limitations in the previous claim on which claim 12 depends but fail to disclose four nearest cosets to successive constellation indices.

Forney discloses is reducing the constellation expansion by using 4D and nD trellis coding (page # 15, lines 17-28, page # 16, lines 1-5) which reads on claim limitations of 'determining at least four nearest cosets to successive constellation indices'. It should be noted in the above mentioned lines that the constellation indices corresponds to 1D, 2D codes (claimed 'received symbols').

It would have been obvious to one of ordinary skill in the art, at the time of invention, to implement the teachings of Forney into Rasky and Ware in order to reduce the constellation expansion so that the needed amount of gain can be achieved as taught by Forney (page # 15, lines 15-20) thus enhance system performance.

16. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rasky et al. (5,278,871) in views of Ware et al. (6,553,518) and Forney (WO 98/32257), as applied to claim 10 & 12 above, and further in view of Barabash et al. (5,640,417) (hereinafter, Barabash).

17. As per claim 13, Rasky, Ware and Forney teach all the limitations in the previous claim on which claim 13 depends but they fail to disclose scaling.

Barabash teaches, 'calculating a scale value based on the two constellation points' (figure 5, elements 50 & 60, col.8, lines 20-34), 'generating a sequence of points based on the at least four nearest cosets, the scale value, and constellation indices corresponding to received symbols' (see claim 8 rejection above).

It would have been obvious to one of ordinary skill in the art, at the time invention was made, to implement the teachings of Barabash into Rasky, Ware & Forney in order to determine the symbol variance and set the circular threshold for constellation points and enable the system to detect the symbols correctly as taught by Barabash (col.7, lines 26-39) thus increase the system reliability.

18. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rasky et al. (5,278,871) in views of Ware et al. (6,553,518) & Yeh (6,112,266), as applied to claims 10, 12 & 15 above, and further in view of Forney (WO 98/32257).

19. Claim 17 is rejected under the same rationale as mentioned in the rejection of claim 12 above.

Conclusion

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Chouly et al. (5,416,801) teaches digital signal transmission system based on partitioning of a coded modulation with concatenated codings (col.13, lines 62-68).
- Yokokawa et al. (2004/0025102) teach encoding device and method and decoding device and method.

Contact Information

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Naheed Ejaz whose telephone number is 571-272-5947. The examiner can normally be reached on Monday - Friday 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Naheed Ejaz
Examiner
Art Unit 2611

NE.
10/10/2007

CHIEH M. FAN
SUPERVISORY PATENT EXAMINER